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ORIGINAL ARTICLES

PREVENTABLE DEFORMITIES OF THE LOWER EXTREMITY.

HENRY C. DOZIER, M. D.,

Surgeon, Marion County Hospital, Ocala, Fla., formerly Camp Orthopedic Surgeon, Camp Funston, Kan., and Surgeon Orthopedic Section, U. S. A. G. H. No. 28, Fort Sheridan, Ill.

During my experience in the Orthopedic Dispensary, development battalions and receiving stations, at Camp Funston, I became very much impressed with the very large number of deformities following various injuries, which in themselves should have been preventable, occurring in the recruits coming to us from the draft boards. Many of the deformities were not handicaps to function, nor did they always interfere with the performance of military duty, although some of them constituted reason for discharge from the army or else assignment to some form of special duty. This was also my experience with the overseas cases returning to this country for reconstruction at Fort Sheridan, and although the reason for this condition of affairs is easily explainable on account of the large number of cases treated, the rush and the nature of the wounds associated with almost every bone and joint injury, I was impressed with what might have been the saving to our government in money and to the man in time from his home and occupation and also in suffering, if it had been possible to prevent unnecessary deformities.

In a recent paper read before an Association of Railway Surgeons, and published in the October number of the *International Journal of Surgery*, I discussed the "Preventable Deformities of the Upper Extremity," and this article is meant to supplement the subject of "Preventable Deformities" by considering those which are possible and of not infrequent occurrence in the lower extremity.

In presenting this subject for consideration, it is not my intention to discuss the treatment of fractures in general, or the detailed treatment of any other injury of the bones, joints or other structures of the lower extremity, but rather to refer to them only as they have bearing on this important subject.

Good function following an injury is what makes the difference between a good and bad result. It is probably more important as an end result than perfect anatomical apposition; good union in good position is usually essential to good function. Function certainly determines the extent and amount of future disability, which is of great importance to the injured because it affects his earning capacity, and also of equal importance to the employer because it handicaps his business, and is the principal determining factor in compensation. For these reasons, this is a subject which will not be without profit to us all.

Given a case of injury, let our first thought be, prevent deformity, then, keeping that thought constantly in mind, set about to secure its accomplishment, remembering that function is the important end to be obtained. The prevention of deformity and thereby the minimizing of disability can be accomplished first by a full and accurate survey or typing of the fracture or injury, reached through a careful examination, and accurate consideration of the anatomy involved and its function, and a faithful use of the X-ray; secondly, the treatment, the efficiency of which will depend on the individual ability and mechanical skill of the surgeon, and thirdly, the constant, or at least the frequent, observation of the injured part. This last point cannot be too strongly emphasized.

For convenience, I will consider the deformities of the lower extremity in five groups, as follows:

1st. Those of the hip joint.
2nd. Those of the thigh.
3rd. Those of the knee joint.
4th. Those of the leg.
5th. Those of the ankle and foot.

In considering broadly the deformities in the several groups, we naturally ask three questions, viz.: What conditions in each group are likely to result in deformity? Second, what deformities are likely to result? Third, can they be prevented, and if so, how? The first and second questions can be answered for all groups, as follows:

1st. Injuries of soft parts, resulting in a large amount of scar-tissue, such as occur in railroad and other industrial accidents, and certain gunshot injuries, may cause anything from slight limitation of motion to complete extra-articular ankylosis of the joint distal to the injury, if it involves extensively the different muscle groups, and this scar-tissue may involve also the nerves of the part, producing partial or even complete paralysis in the muscles supplied by the nerve—the deformity which results depending on the complete or partial interruption of nerve impulses, and upon the particular nerve involved; section or any direct injury to the nerve should be determined at the examination immediately following the injury.

2nd. In fractures, both intra-articular and shaft varieties, there may result very disabling and disfiguring deformities, if unrecognized or only partially reduced; if improperly or incompletely immobilized, and without due regard to the function of the part involved; if splints are improperly applied, or a spiral plaster cast applied too early, before sufficient time has elapsed for the subsidence of swelling; through failure to remove any splint or cast which is causing pain, or in which the circulation of the limb is the least bit interfered with—as is well known, this may be the cause of pressure paralysis and its resulting deformities, and also pressure necrosis, which may result in a considerable slough, followed by scar-tissue and its attendant calamities. It is probably unnecessary to state that a splint should never be applied too tightly, and both the splint and the part should be well padded by a liberal use of sheet cotton wadding. What I have said about the spiral plaster cast does not apply to the use of the moulded plaster splint, which I regard as ideal for both the primary and permanent immobilization of fractures, because the moulded splint conforms more nearly to the contour of the part and, therefore, does not make undue pressure at the site of injury nor on bony prominences, and since it does not make circular constriction there is not the danger from pressure paralysis or necrosis. I do not wish to be understood as condemning the spiral cast except as a primary dressing in fresh fractures. It is well suited as a primary post-operative dressing, because operations are usually performed after the lapse of some days, and then the swelling of the part does not operate to cause trouble, but even here close observation of the part for evidences of pressure, etc., is important.

3rd. Intra-articular injuries, or septic infections of joints frequently result in fibrous or bony ankylosis, which is not always preventable, and under these circumstances it is extremely important to remember function, and so place the part that only a minimum of disability will result.

The question of how best to prevent deformities in the various localities will, I believe, be answered more clearly by an anlysis of cases which actually show deformities which in most instances could and should have been prevented.

Group 1.—The hip joint, if the site of disease (as, for instance, tuberculosis), will usually assume a position of flexion, abduction and internal rotation. This is an extremely common deformity in unrecognized or improperly treated tuberculosis hip disease. Should this deformity become permanent by the occurrence of ankylosis in the

hip joint, which is the desired result in this disease, it would constitute a disabling deformity, because it leads to lumbar lordosis and an ugly limp.

In fracture of the neck of the femur, the most common deformity is shortening, abduction and external rotation of the leg. The quadriceps extensor and the hamstring groups of muscles, together with the gluteal group, contract pulling the distal fragment upward, producing shortening. Eversion, or outward rotation, is brought about mainly by the weight of the limb causing the foot to drop over on the outer side because of the solution of osseous continuity at the site of fracture. This deformity, if allowed to persist, is very apt to result in non-union, or if union should occur there will be an awkward gait and ugly limp, and more than likely incapacitate the injured for any occupation which requires much walking, climbing, etc.

It is, therefore, desirable that we should know and remember the position of election for the hip joint when ankylosis is desired (as in tuberculosis disease), or when it is unavoidable, though not desired, as in certain crushing railroad or other industrial injuries, or in certain metastatic or focal infections or gunshot injuries. Under these circumstances, what position of the limb will afford the injured the maximum degree of function? According to the greatest living orthopedic surgeon, Dr. Sir Robert Jones, "ankylosis should be encouraged in a position of very slight abduction, with the thigh extended and with very slight outward rotation of the limb." This position and the reasons given by the author for its advantages was presumably concurred in by the Orthopedic Council of the Surgeon General's Office, during the late world war, since the Orthopedic War Manual quotes them verbatim and without further comment. The reasons given by this author are as follows: "Adduction deformity brings the limb to near the middle line, interferes with the normal position of the sound limb in walking, and by involving abduction of the sound limb interferes also with a free gait. If the hip is ankylosed in the fully extended position, lordosis and the consequent trouble from backache are avoided, and there is freer pelvic movement in walking if the thigh is slightly abducted. The limb should be very slightly rotated outward, to avoid the unsightly lift of the pelvis as the patient rises on his toes in walking, due to the immobile condition of the hip joint. This gives an easier walk than if the toes are pointed straight forward." Some prominent American surgeons differ with Dr. Jones in that they consider about 10 degrees flexion of the thigh as giving greater function and less disability than when the thigh is straight.

Now, given a case of fracture of the hip, and knowing that the common deformity is shortening, and marked external rotation of the limb, and knowing also that there is considerable danger of non-union if the deformity is allowed to persist, the question arises: How best can I place this limb in order to obtain good union and good function for the injured? The answer is, perfect reduction and maintenance of fragments in apposition by proper immobilization apparatus, which means correction of deformity, which will result in good function, if no other cause for non-union exists, such as interposition of a portion of the capsule, or if the fracture is not in that portion of the neck where the blood supply is too poor for osteogenesis. What is the best method to accomplish reduction of a fracture of the hip? As we well know, it is impossible to manipulate the proximal fragment, except imperfectly through control of the pelvis. The lower fragment is accessible and under control, therefore, by extension applied to lower fragment and counter-extension applied to upper fragment through the pelvis, combined with manipulation of the great trochanter, the fragments are reduced and placed in proper apposition. This is easily said, but I think you will agree with me that it is difficult to accomplish. Assuming that it were possible to accomplish through the agency

of several trained assistants, and the X-ray showed the desired reduction, remember reduction must be maintained until an immobilizing cast is applied and set. This is more than we should reasonably expect from our assistants, and it is always more than we get. Gentlemen, it is next to impossible to accomplish the treatment of a fracture of the hip without the use of a special fracture table, such as the Hawley, or its equivalent. They are expensive, however, and not always available. The following case will illustrate what can be done when such a special apparatus is not at hand, by using a little ingenuity:

Fig. 1, Case No. 18 (G. J.)
Before reduction

Figure 1.—Case 18 (G. J.), male, age 10 years, was thrown from the back of a horse and, in falling, was struck directly over the great trochanter by a low stump, causing a complete fracture of the neck of the femur, right, at about its junction with the shaft of the bone. The diagnosis was not made in the first twenty-four hours—by his parents—but he suffered so intensely that the next day they thought that it must be more than a bad bruise, so I was called. Examination on the first visit showed about one and a half inches shortening in a limb lying in the characteristic attitude—leg rotated outward with foot everted—and considerable swelling and ecchymosis in upper third of thigh. Manipulation was impossible on account of pain. A hypodermic of morphine was given, and the patient removed to the Marion County Hospital and X-rays made. Figure 1 shows condition of fragments before reduction. The limb was immobilized by use of sand bags for five days, at the end of which time the swelling had so nearly subsided that it was decided to attempt reduction and the application of a permanent immobilizing apparatus, by the following improvised method, as we had not at that time a special fracture table:

1. Use an ordinary hospital bed or X-ray table and bind a 2x2-in., oak or pine, wooden post to each side of the footpiece of the bed or table.

2. Insert wide boards between the frame and spring, tranversely, to keep mattress from sagging, in the case of the bed.

3. Apply ordinary two-inch Z. O. adhesive plaster (Buck's extension) from about junction of upper and middle third of thigh on mesial and lateral surfaces of thigh and leg, extending six or eight inches beyond foot. Fix this plaster by a one-inch plaster strip applied spirally to prevent slipping. Then apply a roller bandage over entire adhesive plaster.

4. Attach to the distal ends of the Buck's extension a strong, four-inch muslin bandage, leaving ends about three or four feet long, for the purpose of tying to the wooden post for extension.

5. At this stage it is best to administer an anesthetic (ether).

6. Place patient in the bed with suit case or folded blankets under shoulders, the usual pelvic lifter under hips, and tie the muslin bandage ends to the wooden posts on either side of the foot of the bed, thus producing a position of double abduction of the lower extremities. It will be noted that the degree of abduction of the extremities can be regu-

lated by the distance of the hips from the posts—the closer the pelvis to the posts the greater the angle at the crotch. This would not be true with adult.

7. A broad, heavy muslin swathe is now placed through the groin and one end carried upward across ventral and the other carried upward across dorsal surface of body and fixed to a cross-bar on the head of the bed—for counter-extension.

8. After the patient is firmly attached to the head of the bed by means of the counter-extension swathe, traction is made on the fractured leg and the bandaged ends are attached to the posts; extension is further continued by means of inserting a stick between bandage and twisting. This is continued and combined with manipulation of the great trochanter until the fragments are shown by the fluoroscope or plates to be in the desired position.

9. Cut the roller bandage and remove the spiral plaster strip before the application of the permanent plaster spica.

10. Apply plaster cast, including lower thorax, pelvis, thigh and leg.

11. Patient is left in position until the cast is dry and set.

NOTE.—A pelvis, or hip lifter, can be made by any blacksmith by making a base for an old, inverted buggy step.

Figure 2 shows position of fragments after reduction, and after plaster cast was applied. This method would not be so practical in case of adult, on account of his height.

Mechanically, the result in this case is apparently perfect, and if some of the other causes for non-union in this type of fracture do not operate to bring about a bad result this boy's function should be almost, if not wholly, normal. As a matter of fact, this boy walks without a limp at this time (May 11, 1920). He can run, jump, squat and otherwise perform all the functions of a normal boy.

At best, however, a fracture of the neck of the femur is one of the most difficult problems in all surgery. The anatomico-mechanical conditions, the poor blood supply, the sluggish osteogenesis are all potent influences which are adverse to the securing of satisfactory union and good functional results. If, after a reasonable number of attempts by conservative methods, the surgeon is unable to bring the fragments into satisfactory alignment, as shown by the sterio-X-ray examination, he should not delay operative interference longer than two or three weeks. This last remark is applicable to other fractures as well, but it is believed by surgeons of experience that if ever radical measures are justifiable, they are indicated in the primary treatment of fractures of the hip at all ages where the patient is an operable risk.

Fig. 2, Case No. 18 (G. J.)
After reduction and plaster cast applied

GROUP 2.—The two most common causes for deformity in the thigh are fractures of the femur and extensive scar-tissue.

Fractures may result in deformity if improperly reduced, *i. e.*, if the fragments are permitted to remain overriding, or if proper alignment of fragments is overlooked or neglected. There is also another deformity which does not show up at the time of the injury, but appears long after you have

discharged your patient with good union and good alignment, viz., an external angular deformity at the site of the old fracture, resulting from the surgeon's advising or permitting too early weight bearing. Weight bearing in femur shaft fractures, before the union is firm and the callus is hard, will all too frequently result in the deformity shown in Figure 3, Case 118:

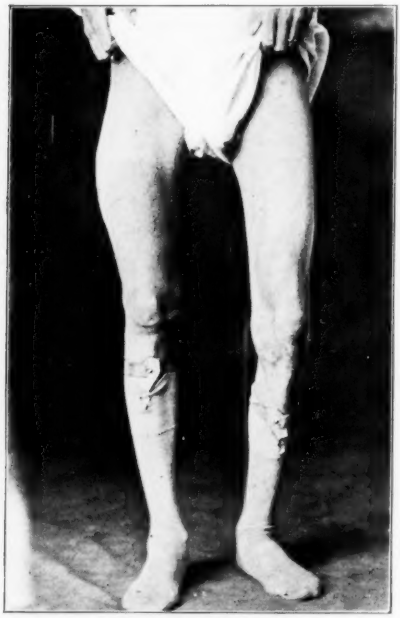

Fig. 3, Case No. 118
Showing external or lateral bowing at site of old united fractured femur, middle third, right. This fracture was operated for non-union, and when cast was removed, fragments were in good alignment and no shortening of limb. External bowing due to too early weight-bearing and shortening is due to the bowing.

This case (G. R.) was a boy of about 16 years of age, who sustained a complete, transverse fracture of the femur, junction of the upper and middle third, right, which resulted in non-union from interposition of soft parts, and required operation. The fragments were reduced and fixed with phospho-bronze wire, and the limb placed in plaster cast in good position and alignment. No shortening, good alignment and good union when cast was removed twelve weeks after operation. Patient was instructed to use crutches and not to bear weight on leg until after six months from date of injury. Three years later (October, 1919), this patient returned to me for an operation for appendicitis, and the deformity shown in Figure 3 was noted and the above photograph made. Seeing one of my own cases, which apparently had been a good result, ruined by too early weight bearing, made me experience a feeling of disappointment for myself and also for my patient. He will not consent to an operation for correction of the deformity, and yet he is the victim of a disfiguring deformity and an ugly, hopping limp. The lesson is obvious—prevent deformity.

Fig. 4
Unreduced fractured femur, mal-united by a spanning callus. Treated in Thomas splint

Fig. 5
Mal-united fractured femur, lower third

Figures 4 and 5 illustrate graphically the deformities which result from failure to completely and properly reduce a fracture. In Figure 4 there is union, with very little overriding (only about one inch of shortening), which offhand might be considered a fairly

good result. Examination of the plate shows marked latero-mesial separation of the fragments, with union by means of a connecting callus. The end result was a weak leg, constantly liable to re-fracture, shortening and limp, and pain at the site of fracture. It was necessary to re-fracture and bone graft before good function was restored.

In Figure 5 note the deformity which has resulted in bringing the posterior surface of the condyles of the femur in relation with the articulating surface of the tibia. At the time of injury, which was due to a shrapnel wound received in action in France, and which was badly infected, it was impossible to completely coapt these fragments, but it well illustrates a condition which is very common, even when this fracture is of the simple variety. It is almost always necessary to reduce this type of fracture by the open method. A bone graft will prevent such a deformity.

Col. Sir Robert Jones, in his "Injuries to Joints," has very fully considered the effects of scar-tissue in causing disability and deformity. The Orthopedic War Manual considers the same subject, and speaks as follows concerning the thigh: "In wounds in the back of the thigh the knee should be kept straight." This is excellent advice and if followed will save much future trouble for the injured. It is misleading in that it does not mention wounds on the anterior surface or front of the thigh, which may also be the cause of the same disability, only from the involvement of a different group of muscles.

Figure 6 shows a soldier who has received a shrapnel wound of the soft parts of the thigh, ventral surface, with an incomplete fracture of the femur, middle third, right. He was treated without a splint. At the time that this soldier came under my observation at U. S. A. G. H. No. 28, Fort Sheridan, Ill., the old fracture was the site of low-grade chronic osteomyelitis, and he was a victim of knee flexion deformity, due to the involvement of the quadriceps femoris group of muscles in a dense mass of scar-tissue, which effectively prevents contraction of this muscle group and, consequently, the leg cannot be extended. It will also be noted, by reference to the picture, that the scar extends mesially and involves the inner hamstrings, which also mechanically prevents extension of the leg. The leg cannot be further flexed at the knee because of the inability of the hamstrings to contract and also because of the mechanical check of the quadriceps femoris group. If this case had

Fig. 6
Shrapnel wound of soft parts, thigh, ventral surface, with F. C. C. incomplete femur, middle third, united now. Site of osteomyelitis. Note sinus deformity consists in "knee at right angle and scar-tissue extensively involving quadriceps group of muscles," causing lost motion at knee.

been treated in a splint with the knee straight, he would have been able to walk without crutches and earn a living, and physiotherapy in the form of ionization and massage would have gradually restored motion in the knee by loosening the "scar-tissue grip" on the muscle group.

Figure 7, Case 43, shows a case with flexion deformity following an old gunshot injury from high explosive shell, which passed through and through thigh, lower third, right, with no nerve or bone injury. His wound, according to his field card, was debrided and Dakinized and treated without a splint. The knee in this case can neither be extended or flexed, being effectively held in semiflexion by the superficial and deep scar-tissue involving all the muscles on the back of the thigh.

The knee joint will naturally assume the position of rest, which is semiflexion, unless this is prevented by the application of splints

with the leg straight. If ankylosis at the knee joint is likely, either from extra or intra-articular causes, then the position in which the knee joint is dressed is of extreme importance, if we would prevent deformity and disability as an end result. The position of election for the knee joint is with the leg fully extended, *i. e.*, with the limb straight. This is the position of Jones, and his reasons

Fig. 7
Shows Case G. S. W. (H. E.). T. & T., thigh, lower third, right, with no nerve or bone injury. Debrided and Dakinized and treated without splint. Knee assumed position of rest and wound healed with scar-tissue so involving the hamstring muscles as to completely fix knee in position shown.

given for this position seem to me to be reasonable and convincing, although I am aware that some of the American orthopedic surgeons prefer about 20 to 25 degrees of flexion at this joint. The author of this position reasons as follows: "Very good reasons may be given in favor of slight flexion, from the point of view of elegance in repose and that of ease in mounting stairs. Ankylosis, as we know, is not necessarily bony; when it is fibrous the tendency is for the flexion angle to increase by exercise. The incidence of the body weight on a slightly bent knee, unless the ankylosis is sound and bony, will increase the flexion. The position of slight flexion is mechanically a weak one, therefore, for carrying body weight. Even when new bone is forming its complete consolidation is sometimes a slow process, and if the surgeon places such a knee in a slightly flexed position, the degree of ultimate flexion is often much greater than he would wish. The advantage of increased strength and stability insured by an extended joint will generally outweigh all other considerations."

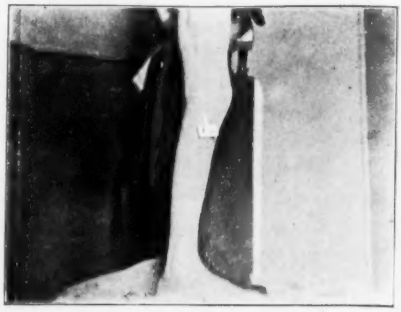

Fig. 8
Result after ionization. Now has full range motion at knee joint

Figure 8, Case 43, same patient as shown in Figure 7, shows the result after several weeks of ionization and massage. Note that the crutches are gone and the leg is completely extended. Upon discharge from the army he had full range of motion in the knee joint.

Figure 9, Case 35, shows a young officer who sustained an injury in the region of the left knee from stepping in a shell hole while on duty with the A. E. F. He had considerable pain at the time, but continued with his

Fig. 9, Case 35
Fracture, internal tuberosity of tibia, thought to be a sprain at time of accident, untreated. Patient continued to walk and has developed this genu-varum and slight genu-recurvatum deformity.

troops. Two or three days later he reported to his unit surgeon, who diagnosed a sprain, strapped knee and advised rest, but the patient did not wish to go to hospital

because he also thought the injury was trivial. No splints were applied. The subjective symptoms gradually subsided except for some pain on prolonged walking or "in wet weather," but he noticed that he was gradually getting bow-legged. He gradually developed a genu-varum and a slight genu-recurvatum deformity. X-rays, made at U. S. A. G. H. No. 28, disclosed an old fracture of the internal tuberosity of the tibia. Bear in mind that the diagnosis was sprain, and the leg was not splinted. It was necessary in this case to do an osteotomy to restore the alignment of his leg, and also to repair a small slit in the fascial expansion on the lateral surface of the knee joint.

I have reported the above case for two reasons, viz:

1st. To caution against a diagnosis of sprain, unless the X-ray is negative, for any bony injury, and the definite symptoms localizing the condition to a definite ligament is present.

2nd. To illustrate a deformity which was absolutely preventable and owed its existence to the failure of the surgeon to insist upon this patient returning to the hospital for X-rays before he allowed him to return to duty.

GROUP 4.—It is not my intention to say anything about fractures of the leg individually, except to remind you that here more than anywhere else our primary thought should be function. It is not enough that the fragments be in end to end position, but we should remember the possibility of rotation of the distal fragments, and the necessity for proper alignment of fragments, all of which must be maintained until union is firm and strong. The reason for particular care in the case of the leg is that the leg's principal function is weight-bearing and propulsion in the act of walking, and unless the weight of the body is properly distributed and falls in the direction and through the structures intended by nature for the accomplishment of that function, there will be subjective pain and objective deformity. In order to accomplish in our cases this desired end result, it will be necessary to be familiar with the statics involved and also the anatomical mechanism which nature has provided for the maintenance of the body equilibrium; to make a faithful use of the X-ray, not only for the purpose of diagnosis but also to determine and test the efficiency of treatment; to possess considerable mechanical skill, and frequently resort will have to be had to an open operation.

Some of the types of deformities to be expected and guarded against in the leg will be illustrated in the following cases:

Figure 10 shows a case with a preventable deformity of the leg, following fracture of both bones, consisting of anterior bowing, and a mesial displacement of the entire leg distal to the fracture, which throws the body weight on the fibula and the tibio-fibular articulation, and outer side of the foot. You will note that the anterior bowing also produces a dorsi-flexion deformity of the foot

Fig. 10
Preventable deformity of leg. Anterior bowing and lateral displacement, due to imperfect reduction

when the patient is standing, and the entire weight-bearing apparatus is disarranged. It is desirable that the body weight should fall principally on the outer side of the foot, as we shall see later, but the tibio-astragaloid and not the tibio-fibular joint was intended by nature to bear the burden of weight in standing and walking. This plate also shows low-grade osteomyelitis, several foreign bodies and sequestra, for which condition this boy was operated on. If the deformities did

not exist, he could be restored to health without disability after his recovery from the osteomyelitis.

Figure 11, Plate No. 1576, shows a fracture of the tibia at about the junction of the

Fig. 11
Posterior bowing at side of fracture, with overriding of fragments. This deformity is always preventable, is unsightly and constitutes a painful disability. Can be corrected by refracture and bone-graft.

middle and distal thirds, which was allowed to unite with marked posterior bowing.

Figure 12, same case, shows the position of the fragments in an antero-posterior view. Note the marked overriding. This fracture is oblique, and I have always found in the oblique type of fractures difficulty in maintaining the fragments reduced without resort to operation and internal fixation.

Scar-tissue in the leg is a prolific source of trouble, especially on account of its effect on the function of the tibio-astragaloid or ankle joint. The position of the joint, distal to any extensive injury of the soft parts of either extremity, should be most carefully

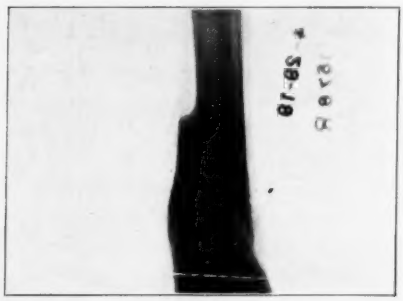

Fig. 12
Oblique fracture, tibia, lower third, showing preventable deformity

watched and placed in a position (the position of election) which will afford the maximum function, should scar-tissue so involve the muscle groups as to interfere with motion in that joint. The position of election for the ankle joint is with the foot placed at right angles with the leg.

Figure 13, Case 37, shows a case of extensive injury to the soft parts, without bony or nerve injury, which was treated without reference to the position of the foot. The foot naturally assumed the position of plantar-flexion, which is the position of rest and of gravity when walking on crutches. The wound healed, scar-tissue has completely bound down the extensor group of muscles

Fig. 13, Case No. 37 (Seigle)
Anterior tibial muscles partially severed and adherent in scar-tissue, resulting in "foot drop"

of the leg, which consequently cannot contract and therefore cannot dorsi-flex the foot. Scar-tissue does not involve the muscles of the back of the leg. The ankle joint and knee are normal, and all movements free on passive motion. The patient is compelled to flex his knee in walking in order to compensate for his inability to dorsi-flex his foot.

Figure 14, Case 14, illustrates the same condition with reference to the scar-tissue, and the same plantar-flexion deformity, only the injury is on the posterior surface of the leg and involves the flexor or tendo-achilles group of muscles. He also was treated without reference to the position of the foot. His foot also assumed the position of rest —and gravity plantar flexion—and with the foot in that position the scar-tissue has

densely and tightly bound down the tendo-achilles, which now acts below the wound as a mechanical check to dorsi-flexion of the foot. This case also sustained a fracture of both bones of the leg, junction of lower and middle thirds, which has united without angular deformity and with only slight short-

Fig. 14, Case No. 14
Fracture both bones, leg, lower third, with "foot drop" deformity, due to scar-tissue involving and binding down tendo-achilles, hence can neither dorsi or plantar-flex foot. Note inversion of foot (intoeing) due to internal rotation of distal fragments.

ening, but internal rotation of the distal fragments has been allowed to take place, and you will note that there is an intoeing, or pigeontoed, deformity also.

In fractures of the leg bones let us guard against shortening, angulation, rotation of distal fragments, and foot-drop. The positions of elections for the various joints should be constantly thought of whenever from any cause a patient is to undergo long confinement in bed. Prolonged assumption of one position will sometimes result in suffi-

Fig. 14½ (Cissell, Leo)
Fracture of ascending ramus of pubes, right, and of ramus ischium, right, unrecognized posterior dislocation, femur, right, osteomyelitis and preventable deformity, both hip, knees and feet.

cient capsular contraction and tendon contracture as will constitute an actual disabling deformity. Figure 14½, Case 6, illustrates just this condition. This patient received an injury of the hip, necessitating many months' confinement to bed in different army hospitals. The position is characteristic—it is the position of rest—hips and knees flexed, and foot plantar-flexed. All this boy's unnecessary deformities resulted from the efforts of the nurse to make him comfortable with pillows under knees, etc. The surgeon thought only of the pathology present, and forgot function.

In treating injuries of the foot proper, the most important thing to remember is to avoid a pronation or vagus deformity of the foot. Such a foot, if not actually, is always potentially a weak foot. Even exaggerated supination of a foot is not to be desired. However, a foot in moderate supination is a strong foot, and will not give, like pronation, constantly increasing disability.

Figure 15, Case 5, and Figure 16, Case 2, both show old fractures of the tarsal bones, compound, comminuted, involving the ankle

Fig. 15 (Skidmore, Lester)
Osteomyelitis with preventable deformity. Old F. C. C. tibia, involving ankle joint, now site of osteomyelitis and ankylosis of tibio-astragaloid joint. The deformity consists in plantar flexion at mid-tarsal joint.

joint, which have resulted in ankylosis of the ankle joint in good position. Note the forefoot has been disregarded and there is present a plantar-flexion deformity at the mid-tarsal joint in the one case, and an adduction deformity at the mid-tarsal joint in the other case.

In conclusion, let us bear in mind the various deformities which are likely to occur in the various localities, and use every means at our disposal, as modern physicians, to accomplish their prevention.

It has not been my intention in this discussion to even attempt to exhaust the subject of deformities following injuries to the extremities, but, if possible, to stimulate more interest in their prevention.

Before the advent of the X-ray a surgeon might have had more excuse for his bad results. He, at least, did his best, and he

Fig. 16 (Kerless, Percy)
Preventable deformity (adduction). Osteomyelitis following compound comminuted fracture tarsal bones

and his patient were satisfied with poor function and even deformity in many instances, because they felt that they had secured the best result in that particular type of injury which was possible. However, now we are living in a different age—the X-ray is here, and the experience of the world war is ours —and we, as a profession, must do something to reduce the deformities which are preventable and which are such a handicap to the efficiency of the individual injured, and such a poor advertisement of our skill as surgeons. One of our prominent surgeons has said that "the responsibility of the physician or surgeon who assumes the care of a fracture cannot be overestimated or overstated. There is no one condition in the whole field of medicine or surgery that involves so much responsibility on the part of the physician or surgeon in charge." This is equally true with those injuries which involve, either directly or indirectly, the various joints. The physician should feel his responsibility, both to his conscience and to his patient. His conscience will always hold him to account, and his patient might do so in the form of a suit for damages.

The patient's value to his family, the community, his employer and himself are affected and vitally dependent on our willingness as physicians to keep constantly in mind, when treating injuries of the extremities, the thought—prevent deformity. That phrase is an essential thought, and it, together with a realization of our responsibility in such cases, and the cultivation within ourselves of an intense dissatisfaction with the all too frequent poor results of the past, will usually lead to good function, or perhaps, in some cases, to inevitably impaired function, but in a position which will afford the least disability.

PROPAGANDA FOR REFORM.

YEAST FOAM TABLETS. — Shorn of verbiage, "Yeast Foam Tablets" are claimed to be dried yeast in the form of tablets. They are put up in typical "patent medicine" style. The advertising for these tablets would lead the public to believe that it is in imminent danger of suffering from an inadequate supply of vitamin B. Though the Yeast Foam propaganda is plainly addressed to the public, specimen packages have been sent to physicians. Thus, the profession is given once more the opportunity to act as an unpaid peddler. (*Jour. A. M. A.*, April 8, 1922, p. 1074.)

QUEEN OF ANTISEPTICS.—This preparation is marketed by a person in Aurora, Ill., calling herself "Mme. Leonard." It is claimed to be "A Perfect Vaginal Germ Destroying Powder and Applicator." The A. M. A. Chemical Laboratory reports that the preparation is composed essentially of boric acid, 97 per cent, and ammoniated mercury, 3 per cent. (*Jour. A. M. A.*, April 8, 1922, p. 1072.)

DIAGNOSIS OF CHRONIC CHOLECYSTITIS.*

R. R. SULLIVAN, M. D.,
Lakeland, Fla.

While chronic cholecystitis is usually found in middle life, careful history taking will bring out history of one or more attacks in early life. It usually runs an indefinite course of about twenty years before onset of various complications. The only hope for cure of patient lies in a diagnosis made from symptoms of cholecystitis instead of those laid out before us as symptoms of complications.

We must not forget the fact that chronic cholecystitis is a very prevalent disease. In a series of 80,000 post mortems, 6 per cent had cholecystitis. Of this 6 per cent (4,800 cases), only 16 per cent had symptoms that referred directly to gall bladder. With these facts in mind, it is evident that an early diagnosis is to be based upon careful history taking, laboratory aids and accurate correlation of all data obtained.

In studying an individual case, it is well to hold in mind that we are dealing with a middle age disease, more frequent in women, and especially those having given birth to several children; that cholecystitis is a hematogenous infection of wall of gall bladder, originating in some other organ of body, very often in the appendix; that we can have intense colic in noncalculous cholecystitis; that most "stomach troubles" are not in the stomach.

Four types of cholecystitis are commonly recognized:

TYPE 1.—Intense colics in region of gall bladder.

TYPE 2.—Atypical colics. No acute pain, but dull aching over gall bladder, with tenderness at border of ribs in front, radiating around right side to back, with nausea and fever.

TYPE 3.—Gastric group. Discomfort after meals, belching, headaches, simulating gastric and duodenal ulcers.

TYPE 4.—Biliary-gastric group. Having biliary colic along with recurring gastric symptoms.

Type 1, with acute colic is readily recognized. When accompanied with an elongated Riedel lobe of liver it may be confused with a colic of septic floating kidney. Appendicitis in an abnormally placed appendix may produce symptoms that are confusing until carefully studied.

Type 2 must be differentiated from lesions of stomach, duodenum, pancreas, coecum, appendicitis, angina pectoris and abdominal aortitis. A careful history taking is first essential. Can often find history of an acute infection of gall bladder in early life. A middle-aged patient, especially a multiparous mother, are points to a positive diagnosis. Will get a history of repeated attacks of indigestion, dull aching over gall bladder, backache, headaches and bilious attacks with fever, all of which are usually relieved by vomiting and brisk purge. May or may not find tenderness over gall bladder in front, depending upon whether the examining finger can touch the gall bladder. Epigastric distress is produced by pressure over gall bladder. Tender spots will be found in right intercostal spaces on level with gall bladder in axillary, scapular lines, and near spine. While X-ray may show outlines of an infected gall bladder and distortions of adjacent structures, their chief aid is found in ruling out lesions of other organs. While hypoacidity of stomach is usually found, may have hyperacidity. The examination of bile segregated from duodenum, gall bladder and liver ducts, after the Metzler technique, is a valuable aid.

Without history of repeated attacks, when pressure over gall bladder fails to radiate an epigastric distress, and when tender spots are absent in right intercostal spaces on level with gall bladder, diagnosis of cholecystitis is not justifiable.

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*Read before the Polk County Medical Society, at Lakeland, April 11, 1922.

In chronic appendicitis will expect to find history of previous acute attacks; do not have the headaches of cholecystitis; pressure over appendix will reproduce the epigastric distress; tender intercostal points will be absent.

In atonic lesions of coecum, will have absence of tender intercostal points; will be able at times to palpate the boggy coecum and make a positive diagnosis in X-ray laboratory.

Chronic pancreatitis, while regarded as secondary to and a complication of cholecystitis, is recognized chiefly by process of elimination.

In angina pectoris and abdominal aortitis, we often find symptoms in region of gall bladder that simulate Type 2 of cholecystitis. Differential diagnosis can readily be made by careful history taking and making use of laboratory aids.

Type 3. In the gastric group we have a discomfort after meals, often followed by a headache, with all symptoms relieved by vomiting. Have gastric symptoms without symptoms pointing directly to gall bladder. Ninety-two per cent of patients with cholecystitis have gastric symptoms. We get a history of long duration, with temporary relief under treatment for biliousness, dyspepsia, etc., only to recur over and over again.

Have here to differentiate gastric and duodenal ulcer and chronic appendicitis.

Placing proper value on history found, and finding that palpating gall bladder reproduces gastric distress; finding one or more tender right intercostal spots on level of gall bladder; finding infected bile segregated from duodenum after the Metzler technique; finding this evidence along with a negative X-ray report on stomach and duodenum, would eliminate ulcer.

In chronic appendicits, would expect history of one or more acute attacks. Headaches are usually absent; the epigastric distress is reproduced by pressure over appendix, but must not forget fact that cholecystitis and chronic appendicitis may co-exist with the appendicitis as the focal infection. X-ray may show adhesions in region of appendix. Have absence of above signs and symptoms in cholecystitis.

Type 4 (biliary gastric type), where we have a combination of Types 1 and 3; having biliary colic with recurring gastric symptoms. Differential diagnosis will be made by same method of elimination as used in Types 1 and 3.

As a summary, chronic cholecystitis must be regarded as a very prevalent disease of about twenty years' duration; a hematogenous infection coming from some focal infection; that in only 16 per cent do we have symptoms that point directly to gall bladder.

A recent stomach and gall bladder upset is not cholecystitis; must have recurrences over long period of time to incriminate gall bladder. A carefully taken, recorded history is first essential in making diagnosis by process of elimination.

Through their nerve supply, the coecum, common duct of gall bladder, appendix and pyloris are closely associated. A diseased condition in any one may masquerade as a lesion of either of the other two.

The only hope for cure lies in a comparatively early diagnosis, one made from symptoms of cholecystitis instead of from those of the numerous complications such as jaundice of common duct obstructions, septic gall bladder, cancer of gall bladder, distortion of adjacent organs by adhesions, pancretitis, etc. Allowing a patient to drift to old age with such symptoms is on a par with waiting for the cacexia of cancer in order to make diagnosis of malignant disease.

PRELIMINARY PROGRAM

Of the Forty-ninth Annual Meeting of The Florida Medical Association

To be Held at Havana, Cuba, June 27-28, 1922.

TUESDAY, JUNE 27TH, 10 A. M.

Call to order by the President, S. R. Mallory Kennedy, M. D., Pensacola.

Address of Welcome to the Association in behalf of the Medical Profession of Cuba—

Response to Address of Welcome—Joseph N. Fogarty, M. D., St. Augustine.

Reports of Officers of the Association.

Adjournment.

2 P. M.—Scientific Assembly.

Gerry R. Holden, M. D., F. A. C. S., *Chairman.*

The Carbohydrate Diathesis, J. C. Yarbrough, M. D., Columbia, Ala., invited guest of the Association.

Some Observations on Local Anesthesia, John E. Boyd, M. D., Jacksonville. Discussion opened by R. B. McIvor, M. D.

Bile Tract Infection, Sheldon Stringer, M. D., Tampa.

Some Observations of Acute Infectious Jaundice, T. M. Rivers, M. D., Kissimmee.

Suppurative Arthritis From Focal Infection, Edmund J. Melville, M. D., St. Petersburg.

Optic Neuritis Resulting From Hyperplastic Ethmoiditis and Sphenoiditis, Shaylor Richardson, M. D., Jacksonville.

The Eye and the General Practitioner, Alice R. Miller, M. D., West Palm Beach.

The Care of the Eyes, E. R. Tuttle, M. D., Miami.

Nasal Obstruction With Special Reference to Adenoids, A. H. Freeman, M. D., Jacksonville.

Tonsilectomy: A Major Elective Operation, J. Brown Davis, M. D., Daytona.

The Function of the Tonsils and a Plea for More Conservative Treatment of Chronic Tonsilitis, M. P. DeBoe, M. D., Key West.

Adjournment.

5 P. M.—Meeting of the House of Delegates.

The President in the Chair.

JUNE 28TH.

9 A. M.—Scientific Assembly.

Gerry R. Holden, M. D., F. A. C. S., *Chairman.*

The Standard of Gynecology, John Dent Peabody, M. D., St. Petersburg.

Extra Uterine Pregnancy, Chas. Jennings, M. D., Jacksonville. Discussion opened by Gerry R. Holden, M. D.

Some Methods in Delivery of Occiput Posterior, C. W. Agars, M. D., Coconut Grove.

Sepsis vs. Asepsis During Parturition, J. C. Davis, M. D., Quincy.

Anoci-Association in Obstetrics, Clarence D. Rollins, M. D., Jacksonville. Discussion to be opened by Ralph N. Greene, M. D.

Results of Radium Treatment for Uterine Cancer, Gerry R. Holden, M. D., Jacksonville.

Bladder Symptoms of Women, L. J. Efird, M. D., Tampa.

Haematuria, F. B. Ennis, M. D., Jacksonville.

Pyelography (lantern slides), R. B. McIvor, M. D., Jacksonville. Discussion opened by Dr. L. W. Cunningham.

Urticaria, J. C. Nowling, M. D., Milton.

A Consideration of the Occurrence and Treatment of Creeping Eruption, J. L. Kirby-Smith, M. D., Jacksonville. Discussion opened by H. C. Dozier, Ocala.

Treatment of Arterial Hypertension, Ralph N. Greene, M. D., Jacksonville.

Arteriosclerosis, Harry L. Putnam, M. D., St. Petersburg.

Dynamics of Cardiac Action, W. A. Stanley, M. D., Lakeland.

Adjournment.

12 Noon.

Election of Officers.

The President in the Chair.

2 P. M.—Scientific Assembly.

Gerry R. Holden, M. D., F. A. C. S., *Chairman.*

Management of Children With Heart Disease, W. S. Coleman, M. D., Miami.

The Treatment of a Case of Tetanus, Stanley Erwin, M. D., Jacksonville.

Communicable Disease in Florida, George Dame, M. D., Jacksonville.

Paper A—The Hemolytic Action of Hookworm Venom.

Paper B—Factors of Longevity in the Semi-Tropics. G. M. Randall, M. D., Daytona.

Personal Experiences With Typhoid Fever, David Rose, M. D., Sebastian.

Unusual Deformity, Complicated With Colonic Fecal Impaction, E. W. Warren, M. D., Palatka.

The Aims of the Gastro-Enterologist, E. B. Milam, M. D., Jacksonville.

Granuloma Inguinale. Report of several cases with special reference to treatment of same with antimony and potassium tartrate intravenously, G. F. Oetjen, M. D., Jacksonville.

Complete Rest in the Treatment of Gonorrhea, Davis Forster, M. D., New Smyrna.

The Biochemical Treatment of Diseases, A. Leight Monroe, M. D., Miami.

Cremation, or the Proper Disposal of the Human Body, G. C. Kingsbury, M. D., Largo.

Wanted—Location or practice in town or city affording educational and religious advantages by a trained Eye, Ear, Nose and Throat Specialist, experienced in Clinical and College Work. G. Wissler, Frederick, Md.

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THE HAVANA MEETING.

Owing to the fact that many of the details of arrangements for the Forty-ninth Annual Meeting of the Florida Medical Association have to be taken care of by correspondence, the preliminary program of the Havana meeting which appears elsewhere in THE JOURNAL is not as complete as we would like it to be. The officers of the Association are hard at work with all the little details, and by the time President S. R. Mallory Kennedy raps his gavel calling the Association to order at 10 o'clock the morning of June 27th everything will be set for what promises to be one of the most interesting meetings in the history of the Association. No side trips of the organization as a body have been arranged for, as it was deemed advisable for each individual to map out his own arrangements. Some will remain longer than others and a trip that would interest one would not appeal to another. It is expected that a get-together dinner will be pulled off the evening of the second day, June 28th.

All those intending making the trip by way of Jacksonville over the Florida East Coast Railway should advise Dr. Graham E. Henson, St. James Building, Jacksonville, so that suitable Pullman car arrangements can be made for the party. If a large number of members wait until they reach the Terminal depot in Jacksonville before making their reservations, considerable confusion and annoyance is bound to occur. Travel is heavy and the railroad officials cannot make suitable arrangements unless they are advised in sufficient time. This need not prevent the man who only finds out at the eleventh hour that he is able to go from attending the meeting, but we wish to impress on those who have made up their minds some time in advance to send in notice of their intentions. As stated in previous issues of THE JOURNAL, those traveling by the Tampa route should make their reservations direct with the Peninsular and Occidental Steamship Company, Port Tampa.

PROPAGANDA FOR REFORM.

PULVANE.—In a 12-page pamphlet sent out by the Pulvane Laboratories, Inc., Des Moines, Iowa, and purporting to deal with "The Therapy of Pulvane, an Advanced Method for the Treatment of Respiratory Diseases," we are told that Pulvane "was developed in a United States army general hospital by officers of the medical department." Pulvane is administered by inhalation, at the offices of the Pulvane Laboratories, Inc. Its "discoverer," it is declared, chanced on the method of "introducing into solution and volatilizing a certain germicide, extremely rare in its usage, because of its resistance, heretofore, to attempts to bend it to scientific will." This "rare" medicament is alpha naphthol. But since the discovery of this volatilizing method "three other ingredients of high therapeutic value have been added." It is stated that the "medical directors" will be glad to name every ingredient of Pulvane to any reputable member of the profession. Nothing is said about disclosing the amounts of the ingredients of Pulvane and hence the information offered is no more complete than that furnished for such patent medicines as Peruna. With regard to the claim that Pulvane was "developed in a United States army general hospital by officers of the medical department," Surgeon-General Ireland, of the United States army, announces that the medical department of the army had nothing whatever to do with the matter and that it thoroughly disapproves of the methods of the promoters of the concern. (*Jour. A. M. A.*, March 11, 1922, p. 750.)

NEW AND NONOFFICIAL REMEDIES.

AMMONIUM ICHTHYOLATE - MEADOWS.—An aqueous solution, the important constituents of which are ammonium salts of indefinite, complex, organic acids, partaking of the nature of oxygenated bodies and sulphonates held in colloidal dispersion. It is derived from an oily distillate of a fossiliferous bitumen found in Texas. It is claimed that ammonium ichthyolate-Meadows has the therapeutic properties of ichthyol. (See New and Nonofficial Remedies, 1921, p. 344.) It is a redish-brown, viscous fluid, having a faint odor. It is soluble in water and miscible with glycerine and fatty vehicles. Meadows' Oil and Chemical Corporation, Durant, N. Y. (*Jour. A. M. A.*, April 1, 1922, p. 967.)

QUINIDINE.—QUINIDINA.—An alkaloid obtained from the bark of various species of cinchona. Quinidine acts upon the heart in such a manner as to bring about cessation of fibrillation of the auricles in a certain proportion of instances. It is used to restore the normal rhythm of the heart in cases of auricular fibrillation. The drug is not without unpleasant and even dangerous effects. Cases of sudden death from its use have been reported. Quinidine is generally administered as quinidine sulphate. Two-tenths gm. is given as a preliminary dose. If no untoward effects result; the drug is administered on the following day in doses of from 0.2 to 0.4 gm., from three to five times a day and continued for from one to three days.

QUINIDINE-P. W. R.—A brand of quinidine-N. N. R. Powers-Weightman-Rosengarten Co., Philadelphia.

QUINIDINE-N. Y. Q.—A brand of quinidine-N. N. R. New York Quinine and Chemical Works, New York.

QUINIDINE-M. C. W.—A brand of quinidine-N. N. R. Mallinckrodt Chemical Works, St. Louis.

QUINIDINE SULPHATE.—QUINIDINE SULPHAS.—The sulphate of quinidine. For actions, uses and dosage see under quinidine. It may be administered in the form of cachets, capsules, pills or tablets.

QUINIDINE SULPHATE-P. W. R.—A brand of quinidine sulphate-N. N. Powers-Weightman-Rosengarten Co., Philadelphia.

QUINIDINE SULPHATE-N. Y. Q.—A brand of quinidine-N. N. R. New York Quinine and Chemical Works, New York.

QUINIDINE SULPHATE-M. C. W. — A brand of quinidine sulphate-N. N. R. Mallinckrodt Chemical Works, St. Louis. (*Jour. A. M. A.*, April 8, 1922, p. 1051.)

BENZOCAINE-SEYDEL.—A brand of benzocaine-N. N. R. (See New and Nonofficial Remedies, 1922, p. 39.) The Seydel Manufacturing Co., Jersey City, N. J.

STERILE SUSPENSION MERCURY SALICYLATE IN OLIVE OIL 1 C. C.—Each c. c. contains 0.097 gm. (1½ grains) of mercuric salicylate. (See New and Nonofficial Remedies, 1922, p. 193.) Intra Products Co., Denver, Colo. (*Jour. A. M. A.*, April 29, 1922, p. 129.)

VEN STERILE SOLUTION MERCURY BENZOATE 1 C. C.—Each c. c. contains mercuric benzoate, 0.02 gm. (1-3 grain). (See New and Nonofficial Remedies, 1922., p. 192.) Intra Products Co., Denver, Colo.

VEN STERILE SOLUTION PROCAINE 1 C. C. —Each ampule contains 1 c. c. of a 1 per cent solution of procaine-N. N. R. (See New and Nonofficial Remedies, 1922, p. 35.) Intra Products Co., Denver, Colo. (*Jour. A. M. A.*, April 22, 1922, p. 1201.)

PUBLISHER'S NOTES

AN EMERGENCY REMEDY.

When the heart fails suddenly, as in shock, collapse, or anaphylaxis, the physician stands in need of a heart tonic that will act at once and that can be administered hypodermically. There is probably nothing in the whole materia medica that will serve him so well in such an emergency as Adrenalin (P. D. & Co.)

Of almost equal urgency is the condition of the asthmatic patient when the attack comes on, and the rapidity with which Adrenalin acts in these cases has made it indispensable throughout the medical world.

Persistent gastric hemorrhage makes the same sort of demand upon the physician, and here, too, Adrenalin, acting directly on the neurovascular tissues, stanches the bleeding almost instantly. In other forms of hemorrhage it is often useful also.

Adrenalin, we are told, is accurately standardized on animals, its effect upon the blood vessels being demonstrated by the administration of as small an amount as 1/6000 grain.

Adrenalin is a Parke-Davis product, having been introduced to the medical profession by that house in 1901.

Calcreose

In Bronchitis and Tuberculosis

Calcreose is particularly suitable as an adjunct to other remedial measures. **Calcreose** contains 50% creosote in combination with calcium. **Calcreose** has all the pharmacologic activity of creosote but is free from untoward effects even when taken in large doses for long periods of time.

Sample 4 grain tablets supplied to physicians upon request.

THE MALTBIE CHEMICAL CO., NEWARK, N. J.